



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Ching Man Tsui et al.

Application No.: 10/829,431

Filed: April 22, 2004

For: APPARATUS AND METHOD
FOR TESTING
SEMICONDUCTOR DEVICES

Group Art Unit: 2829

Examiner: Vinh P. Nguyen

Appeal No.: _____

APPEAL BRIEF

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This appeal is from the decision of the Primary Examiner dated May 7, 2007, rejecting claims 1-4 and 8-12, which are reproduced as the Claims Appendix of this brief.

A fee of \$500 for an appeal brief was previously paid on May 30, 2006. Please charge the balance of \$10, for the amount of the fee that is currently due under 37 CFR § 41.20(b)(2), to Credit Card. Form PTO 2038 is submitted herewith.

The Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. §§ 1.17, and 41.20 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800.

Adjustment date: 12/27/2007 JADD01
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01 FC:1482 -500.00 OP

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I. Real Party in Interest

The subject application is assigned to ASM Assembly Automation Limited, of Hong Kong, China.

II. Related Appeals and Interferences

There are no other prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by, or have a bearing on the Board's decision in this appeal.

III. Status of Claims

The application contains claims 1-15, all of which are currently pending. Claims 1-4 and 8-12 stand rejected, and form the basis for this appeal.

The Office Action also contains objections to claims 1, 5, 7, 10, 12 and 13. Since these objections are not appealable, and do not affect the issues involved in this appeal, they are not addressed herein, and will be dealt with as necessary once the issues on appeal have been resolved.

The Office Action does not acknowledge the presence of claims 14 and 15 in the application, and therefore it is unclear from the record whether they are considered to contain allowable subject matter.

IV. Status of Amendments

There were no amendments filed subsequent to the Office Action dated May 7, 2007.

V. Summary of Claimed Subject Matter

The claimed subject matter is generally directed to the testing of semiconductor devices, and more particularly to an apparatus for supporting the devices during test operations. Although not limited thereto, the claimed apparatus

is particularly suited for non-singulated semiconductor devices that are packed on a relatively thin leadframe. Because of its thin nature, such a leadframe is susceptible to buckling and potential damage during the testing procedure. The apparatus set forth in the appealed claims provides support for these types of leadframes, without the need to modify the semiconductor device packages, for example by trimming and bending the leads to enable them to contact a test head out of the plane of the leadframe. (Page 2, line 9 to page 3, line 18).

Figure 2 illustrates an embodiment of a leadframe carrier 2 comprising a main body 20 and a leadframe support member 21. The leadframe support member is formed with grooves 22 that are sized to receive non-singulated semiconductor devices that are formed with a leadframe. (Page 9, lines 3-21).

The grooves 22 are arranged on the support member 21 such that the leads extending from semiconductor devices within the grooves rest upon a surface of the support member during a testing operation. In particular, the leads rest on the surfaces of the "islands" that are disposed between adjacent grooves, as well as the upper surface of the support member 21 adjacent the outer edge of the outermost grooves. This arrangement is depicted in Figure 16 of the application. The small rectangular boxes depict the ends of semiconductor devices 90 disposed within the grooves. The leadframes that extend horizontally from these devices rest on the upper surface of the support member 21. During testing, when pressure is applied to the leads by a test probe head, as represented by the downwardly pointing arrows, this pressure is counteracted by the leadframe support member on which the leads are resting, as illustrated by the upwardly directed arrows. Thus, the leads are not subject to deformation or damage during the testing process. (Page 13, lines 9-21).

Claim 1 is the only independent claim involved in this appeal. A mapping of this claim to representative portions of the disclosure follows:

1. Apparatus for supporting, during a testing operation, a leadframe formed with at least one row of non-singulated semiconductor devices (Figures 1 and 2, carriers 2; page 7, lines 2-8; Figure 16, devices 90; page 13, lines 9-15), comprising a main body (Figure 2, body 20; page 9, line 4) and a leadframe support member (Figure 2, member 21; page 9, lines 4-5), wherein said leadframe

support member is formed with at least one groove (Figure 2, grooves 22; page 9, lines 9-12) for receiving said semiconductor devices such that, during the testing operation, leads extending from said devices rest upon a surface of said support member (Figure 16; page 13, lines 16-21).

Dependent claim 3 recites that the supporting apparatus includes a means for releasably gripping a leadframe, and dependent claim 5 recites a means for moving gripping members into and out of engagement with a leadframe. Referring to Figure 2, the carrier 2 includes leadframe gripping means 23. The structure of these gripping means is depicted in Figures 10 and 11 of the application. Each gripping means comprises a pair of gripping members 25 that are disposed on respective sides of the grooves. A spring 31 extends between the opposed gripping members, and moves them towards one another, to engage and hold a leadframe on the support member 21. To release the engagement, compressed air introduced through an inlet 60 acts upon a piston 64, to rotate the gripping members against the bias of the spring. (Page 9, line 22 to page 11, line 13). The compressed air is provided by an air distribution assembly 70 formed on each side of the main body 20 (Figures 4, 14 and 15; page 15, line 16 to page 17, line 13).

VI. Grounds of Rejection to be Reviewed

The non-final Office Action presents a single ground of rejection for review on this appeal, namely whether claims 1-4 and 8-12 are unpatentable under 35 U.S.C. §102(b), in view of the Jeong et al patent (U.S. Patent No. 5,990,692).

VII. Argument

Claims 1-4 and 8-12 stand rejected under 35 U.S.C. §102(b), as being anticipated by the Jeong et al patent. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The patent of Jeong et al, as

applied in the Office Action, fails to meet this standard, because all of the elements of the claims are not expressly or inherently described.

A. Claims 1, 2 and 9-12

Claim 1 recites an apparatus comprising a leadframe support member, wherein the leadframe support member "is formed with at least one groove for receiving said semiconductor devices." The Office Action insists that "groove" is a broad term, and for this reason, the windows 22 of Jeong et al may be considered grooves. Applicants maintain that the Jeong et al patent does not show grooves as claimed. Rather, the Jeong et al patent only shows windows 22, which the Office Action interprets as grooves. However, such an interpretation of the claimed language is not reasonable, as required by MPEP § 2111, and the plain meaning of the term "groove" must be considered when interpreting the claim. MPEP § 2111.01.

The Office Action has not cited any authority or provided reasoning to support the proposition that a person of ordinary skill in the art would consider the aperture, or window 22, to be a groove. Webster's New Collegiate Dictionary defines a groove as "a long narrow channel or depression." The present application discloses precisely this arrangement, for example, as shown in Figures 2-4 and 16. The Dictionary does not equate, or even associate, an aperture or window with a groove. When considering the broadest reasonable interpretation, the words of the claim must be given their plain meaning. It is readily apparent, based on the Dictionary definition, that the plain meaning of the term "groove" does not include windows or apertures. An interpretation to the contrary is thus beyond the bounds of "reasonable".

Claim 1 goes on to recite that during testing, leads from the semiconductor device "rest upon a surface of said support member." An example of this feature is shown in Figure 16. Semiconductor devices 90 are received in respective grooves of the support plate 21. The semiconductor devices are formed on leadframes that extend outwardly from the device, and rest upon the support plate. At a position where the leadframes rest upon the support plate, pogo pressure pins (shown as downward extending arrows in Figure 16) contact the leads. The pressure applied

from the pins is opposed by the support plate, as a result of which the leadframe remains stationary, rather than being bent.

The Office Action does not acknowledge this specific feature of the claim. Rather, the Office Action appears to rely on a prior version of claim 1, not the currently pending version.

In contrast to the claimed arrangement, the Jeong et al patent does not disclose leads from a semiconductor that rest upon a surface of the support member. Rather, the Jeong et al patent provides for an arrangement where a holding plate 20 includes a plurality of windows 22. A chip 1 is provided with leads 12, on a leadframe 10. The leadframe 10 is placed on the holding plate 20. The leads 12 are exposed through windows 22. Column 4, lines 21-28. Thus, the leads are suspended over the window, or aperture, and do not rest upon the holding plate. Importantly, the Jeong et al patent expressly provides that the leads are supported by adhesive tape 18. Column 4, lines 7-8. Only the leadframe 10 rests upon the holding plate 20. If anything, this arrangement explicitly teaches away from the concept of having leads "resting" upon a surface of a support frame.

From discussions with the Examiner, it appears his position is based on an observation that the leads 12 in the Jeong et al patent are located on the same plane as the surface of the holding plate. This fact is irrelevant for two reasons. First, the Examiner's position does not address the specific claim language that the leads of a semiconductor device "rest upon a surface" of the support member, i.e. they are actually in contact with the surface. Second, the claims do not merely recite that a surface of the leads is coextensive with a surface of the support member. Again, the claims recite that the leads "rest upon" a surface of the support member. This is not shown in the patent of Jeong et al. Thus, the patent of Jeong et al does not teach every element of the claim, as is required for a rejection based on anticipation.

Claims 2 and 9-12 ultimately depend from claim 1. For at least the reasons cited above regarding claim 1, these claims also are not anticipated by the reference.

B. Claims 3, 4 and 8

Claim 3 recites that the apparatus further comprises means for releasably gripping a leadframe so as to hold the leadframe in place. In rejecting this claim, the

Office Action refers to guide pins 46 of the Jeong et al patent. Applicants respectfully submit that these guide pins do not constitute "means for releasably gripping" a leadframe, as recited.

The Jeong et al patent does not discuss the guide pins 46 as performing any "gripping" function. Webster's New Collegiate Dictionary defines "grip" to mean "to seize or hold firmly". In the Jeong et al patent, the guide pins merely guide other elements into position on the base 40. There is no suggestion that the guide pins seize or firmly grasp the leadframe. In fact, the leadframe 10 is capable of vertical movement along the guide pins. Thus, the guide pins do not grip the leadframe to hold it in place, as recited by the claim. Therefore, the Jeong et al patent does not teach every element as set forth in the claim. Accordingly, the anticipatory rejection is improper.

Claims 4 and 8 ultimately depend from claim 3. For at least the reasons cited above regarding claim 3, claims 4 and 8 are also not anticipated by the reference.

C. Conclusion

For at least the foregoing reasons, the Jeong et al patent does not anticipate the subject matter of the rejected claims. The holding plate of the Jeong et al patent does not have at least one groove that receives semiconductor devices, nor does the Jeong et al patent show an arrangement such that, during a testing operation, leads extending from the devices rest upon a surface of a leadframe support member. Further distinguishing features, recited in the dependent claims, are likewise not taught by the Jeong et al patent.

The rejection of claims 1-4 and 8-12 is not properly founded in the statute, and should be reversed.

VIII. Claims Appendix

See attached Claims Appendix for a copy of the claims involved in the appeal.

IX. Evidence Appendix

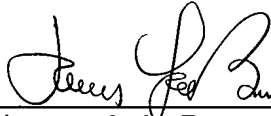
(none)

X. Related Proceedings Appendix
(none)

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VIII. CLAIMS APPENDIX

The Appealed Claims

1. Apparatus for supporting, during a testing operation, a leadframe formed with at least one row of non-singulated semiconductor devices, comprising a main body and a leadframe support member, wherein said leadframe support member is formed with at least one groove for receiving said semiconductor devices such that, during the testing operation, leads extending from said devices rest upon a surface of said support member.

2. Apparatus as claimed in claim 1 wherein said leadframe support member is formed with a plurality of parallel grooves.

3. Apparatus as claimed in claim 1 further comprising means for releasably gripping a said leadframe so as to hold said leadframe in place.

4. Apparatus as claimed in claim 3 wherein said gripping means comprises a pair of gripping members disposed on respective sides of said groove.

5. Apparatus as claimed in claim 4 wherein means are provided for moving said gripping members into and out of engagement with said leadframe.

6. Apparatus as claimed in claim 5 wherein said moving means is actuated by compressed air.

7. Apparatus as claimed in claim 6 wherein a plurality of pairs of gripping members are provided, and wherein said compressed air is provided directly to one

said pair and is distributed to the other said pairs by an air distribution assembly formed in the main body.

8. Apparatus as claimed in claim 3 wherein said gripping means extends through apertures formed in said leadframe support member.

9. Apparatus as claimed in claim 1 wherein said main body is formed with locating pins for locating the leadframe support member on the main body.

10. Apparatus as claimed in claim 1 wherein said main body is formed of a conducting material and an electrical grounding is provided at holes located on the main body.

11. Apparatus as claimed in claim 1 wherein the leadframe support member is formed of a high resistivity electrically insulating material.

12. Apparatus as claimed in claim 1 wherein said main body is provided with identification means.

13. Apparatus for supporting during a testing operation a leadframe formed with at least one row of non-singulated semiconductor devices, comprising a main body, a leadframe support member, wherein said leadframe support member is formed with at least one groove for receiving said semiconductor devices such that in use leads extending from said devices lie on a surface of said support member, and means for coupling said main body with a transport mechanism.

14. Apparatus as claimed in claim 1, wherein each groove receives a plurality of semiconductor devices.

15. Apparatus as claimed in claim 2, wherein each groove receives a plurality of semiconductor devices.